Minimally invasive non-surgical procedures in treatment of uterine fibroids

ESSAY

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LIST OF ABBREVIATIONS

aaPVA	Acrylamido polyvinyl alcohol
AVM	Arterio-venous malformation
BMI	Body Mass Index
DSA	Digital Subtraction Angiography
F	French
FDA	United States Food and Drug Administration
GnRH	Gonadotropin Releasing Hormone
GRE	Gradient Echo
H&E	Haematoxylin & Eosin
HRQoL	Health-related quality of life
IUD	Intra-uterine device
LMS	Leiomyosarcoma
MRI	Magnetic Resonance Imaging
MRI-g HIFU	MRI-guided High Intensity Focused Ultrasound
nsPVA	Non-spherical polyvinyl alcohol
OB/GYN	Obstetrics & Gynecology
PA	Postero-anterior
PCA	Personal controlled analgesia
PVA	Polyvinyl alcohol
QOL	Quality of life
RCT	Randomized controlled trial
sPVA	Spherical polyvinyl alco’3hol
TA	Trans-abdominal
TAGM	Trisacryl gelatin microspheres
TV	Trans-vaginal
UAE	Uterine Artery Embolization
UFE	Uterine Fibroid Embolization
US	Ultrasound

INTRODUCTION

Uterine fibroids are benign, hormone-sensitive tumors of the smooth muscles; the incidence in women of child-bearing age has reported to be as high as 40%, depending on age. Fibroids are considered the most common benign uterine tumors in women of reproductive age. Associated symptoms include dysmenorrhea, spotting and hypermenorrhea leading to anemia, lower abdominal pain, pressure on adjacent organs and disorders of micturition and defecation. Submucosal and intramural fibroids which distort the endometrial cavity are considered to impair fertility. ***(Bohlmann et al., 2014).***

Trans-abdominal (TA) and Transvaginal ultrasound (TV) scans are usually the initial investigation for examining the female pelvis. Transvaginal scans are more sensitive for the diagnosis of small fibroids. However; MRI is the preferred method for accurately characterizing pelvic masses. It has been shown to be more sensitive in identifying uterine fibroids than ultrasound examination. ***(Wilde Sue et al., 2009).***

Fibroids are often described according to their location in the uterus as proposed by International Federation of Gynecology and Obstetrics (FIGO). Intramural myomas develop from within the uterine wall, Submucosal myomas derive from myometrial cells

just below the endometrium, Subserosal myomas originate from the myometrium at the serosal surface of the uterus and Cervical myomas are located in the cervix, rather than the uterine corpus. ***(Elizabeth.,2015).***

Medical therapies for fibroids such as Gonadotrophin-releasing hormone analogues effectively reduce bleeding and decrease fibroid size but can only be used for a limited time because of their adverse effect on bone mass. Medical therapies such as combined oral contraceptives, non-steroidal anti-inflammatory drugs and progestogens, appear to be less effective in the presence of uterine fibroids. ***(Gupta et al., 2014).***

Surgical therapies for fibroids include hysteroscopic endometrial ablation, transcervical resection of sub mucous fibroid, laparoscopic myomectomy or myolysis, laparoscopic bipolar coagulation or dissection of uterine vessels (or both), myomectomy and hysterectomy. Hysterectomy has an approximately 3% incidence of major complications, while myomectomy is associated with long-term problems such as fibroid recurrence, adhesion formation, and the increased possibility of uterine rupture during pregnancy and vaginal delivery.**(*Gupta et al., 2014).***

Uterine fibroid embolization (UFE) is based upon the hypothesis that reduction of myometrial arterial blood flow will

result in infarction of fibroids and control symptoms. It is an option for symptomatic premenopausal women who wish to retain their uterus, escape side effects associated with prolonged medical therapy, and avoid surgical treatment (eg, hysterectomy, myomectomy). UFE is rarely indicated in postmenopausal women. Other relative contraindications to UFE include current use of GnRH analogs and sub-mucosal fibroids. (***Ducksoo et al., 2015).***

Image-guided thermal therapy (IGT) tumor ablation typically occurs with applying a rapid thermal change (> 55°C for heat or < -20~50°C for cold). Ideally, the imaging technique for guiding thermal ablation should provide target definition, anatomical information and temperature feedback. Recent developments in MR thermometry have made it the most reliable method for real-time temperature monitoring. (***Shen et al., 2009).***

Ultrasound-guided radiofrequency ablation (RFA) is an uncomplicated minimally invasive ultrasound-guided needle technique. It uses radiofrequency energy, and the heat generated causes localized coagulation necrosis of fibroid tissue. RFA produces necrosis in a restricted area. It results in substantial reduction in the size of fibroids and in related symptoms. ***(Iversen et al.,2012).***

High-intensity focused ultrasound therapy has received increasing interest in the management of solid malignancies and benign tumors. In the management of uterine fibroids, high-intensity focused ultrasound induces focal thermocoagulation of the fibroids. Magnetic resonance imaging (MRI) has been used to define the target for controlling and monitoring the ablation. Recently, MR guided high-intensity focused ultrasound has been introduced to monitor the ablation process. Results obtained by various research groups have shown that using MR guided high-intensity focused ultrasound for treatment of fibroids is safe, effective, and highly acceptable to patients. ***(Cheung et al.,2013).***

AIM OF THE WORK

The aim of this study is to review non-surgical & minimally invasive procedures applied in the treatment of uterine fibroids.

CHAPTER 1: ANATOMY OF THE UTERUS AND UTERINE ARTERIES